

# PATENT ABSTRACTS OF JAPAN

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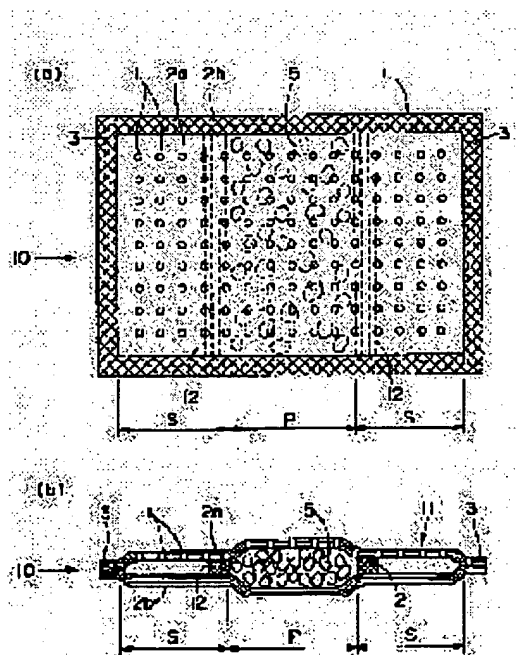
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## (54) WATER-ABSORBING SHEET

(57)Abstract:

PROBLEM TO BE SOLVED: To prepare a water-absorbing sheet in which an absorbent for water can efficiently absorb water.

SOLUTION: This sheet consists of a bag 11, a granular absorbent 5 for water housed only in a part P of the bag 11 and a sealing means 12 to seal the granular absorbent 5 for water to prevent the absorbent from spreading in the whole bag 11. The bag 11 is produced by laminating thermoplastic films 2a, 2b at least one of which has lots of pores 1 and then sealing the peripheral part 3. The diameter of the pores 1 of the bag is in such a range that the pores permeate water but do not leak the granular absorbent 5. The sealing means 12 is opened by absorption of water.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This water absorption sheet is advantageously used about a water absorption sheet for this invention to absorb and hold moisture in the hygienic-goods fields, such as the preservation fields, such as a perishable food, a disposable diaper, and sanitary items, the irrigation|drainage-and-reclamation-engineering field which carries out absorption maintenance of the moisture in soil.

[0002]

[Description of the Prior Art] When food, such as meat and a fish, is vacuum-packed with a non-permeability film and saved by the chilled temperature zone, or when it thaws after carrying out frozen preservation, the bouillon called a drip exudes. If this drip collects between food and a film, reduces quality, such as making the food which contacted for a long time discolor etc., and spoils commodity value and a discoloration part is deleted, it has the problem of reducing the yield so much. Furthermore, since this drip also serves as a hotbed of propagation of bacteria, the retention period of food also becomes short.

[0003] From the former, the approach using a water absorption sheet as what removes a drip is learned. Food will be contacted to sheet-like water absorption material, and will be saved, and this approach will make this water absorption material absorb the drip which exudes during preservation, and will remove. This water absorption sheet has composition which put the water absorption layer which made the water absorption material particle support over the whole surface, such as paper or pulp, between the surfaces of the water flow nature which consists of two sheets of papers, a nonwoven fabric, or a thermoplastic film in which much pores were formed. This water absorption sheet removes the moisture adhering to the front face of the goods of not only the purpose that removes a drip but food and others, or is used also as physiology sanitary goods and irrigation|drainage-and-reclamation-engineering materials which carry out absorption maintenance of the moisture in soil etc.

[0004]

[Problem(s) to be Solved by the Invention] Although the water absorption sheet of the above-mentioned conventional type has the composition that water absorption material was supported over the whole surface of a water absorption sheet Although a drip will permeate the interior from some water absorption sheets, it will be absorbed by the water absorption material of the part which permeated and the water absorption material of this part will be swollen by water absorption if a perishable food etc. is actually saved on this water absorption sheet The problem that other parts are left behind moisture's not shifting and not absorbing moisture arises. The granular water absorption material to which the moisture which passed some epidermis films of a water absorption sheet locally was immediately absorbed by nearby water absorption material, and absorbed moisture swells this, the particle pseudo-\*\* it in the shape of a dumpling mutually, and it is considered because it stops distributing moisture to other parts. [0005] Moreover, since this kind of water absorption sheet is throwing away, it will discharge the trash beyond the need that non-absorbed moisture water absorption material remains by one use, and it also

becomes a problem on an environment while it is uneconomical. In order that this invention may solve the above-mentioned problem, it is made, therefore the purpose is in offering the water absorption sheet which can absorb moisture efficiently using comparatively little water absorption material.

[0006]

[Means for Solving the Problem] The bag body which the above-mentioned technical problem piled up the thermoplastic film of two sheets with which much pores were formed in one of these at least, and carried out the seal of the periphery section, It consists of granular water absorption material made unevenly distributed in the part in this bag body, and a closure means closed so that this granular water absorption material might not spread in [ whole ] a bag body. It is solvable by offering the water absorption sheet formed so that it might have the aperture of the range where it does not leak granular water absorption material although the pore of the above-mentioned bag body passes moisture and closure discharge of the above-mentioned closure means might be carried out by water absorption.

[0007] As for the aperture of the pore formed in the above-mentioned bag body, it is desirable that it is within the limits of 50 micrometers thru/or 150 micrometers. The above-mentioned closure means is the heat-sealing section or jointing formed between the thermoplastic films of two sheets which form a bag body, and when water absorption material absorbed water and expands, as for this heat-sealing section or jointing, it is desirable to be formed so that it may exfoliate by that expansion pressure. Moreover, this jointing is water solubility or water-softening nature, and it may be formed so that it may exfoliate with the moisture which passed the pore of a bag body.

[0008] Furthermore, the above-mentioned closure means is the PE liner made of the product made of paper, or a nonwoven fabric enclosed with the interior of said bag body, the aforementioned granular water absorption material may be enclosed with this PE liner, and it may be formed so that a part of periphery section [ at least ] of the PE liner of a parenthesis may carry out opening with the moisture which passed the pore of a bag body. This PE liner is a PE liner which consists of a water soluble film again, and you may come to enclose the aforementioned granular water absorption material in this PE liner. The above-mentioned granular water absorption material can sink in by the wetting agent which consists of hydrophilic polyhydric alcohol.

[0009]

[Embodiment of the Invention] Hereafter, an example explains the gestalt of operation of this invention using a drawing. However, this invention is not limited by the following examples.

(Example 1) Drawing 1 (a) and (b) show the water absorption sheet of an example 1. Polyethylene film (it is hereafter described as "hole opening film") 2a in which, as for this water absorption sheet 10, much pores 1 and -- were formed, The bag body 11 which piled up nonporous polyethylene film 2b in which pore is not formed, and heat sealed the periphery section 3, It consists of granular water absorption material 5 (4.5g) made unevenly distributed in a part of this bag body 11 (it is hereafter described as "the maldistribution region P"), and a closure means 12 closed so that this granular water absorption material (it is only hereafter described as "water absorption material") 5 might not spread in [ whole ] a bag body 11.

[0010] The closure means 12 in this example is the heat-sealing section (12) formed between 2bs of two sheets, polyethylene film 2a and 2b, and this heat-sealing section 12 is weakly formed in extent which exfoliates by that expansion pressure, when the water absorption material 5 absorbed water and expands. Peel strength to which the peel strength was based on JIS-Z -1707 is made into within the limits of 0.1kg / 15mm thru/or 1.0kg / 15mm.

[0011] The dimension of the bag body 11 in this example 1 is 170mmx250mm, and each thickness of polyethylene film 2a which forms a bag body 11, and 2b is 50 micrometers. The pore 1 of 100 micrometers of apertures within the limits which pass moisture and do not leak the granular water absorption material 5, and -- are formed in hole opening film 2a so that it may become 1.0% of numerical apertures. Moreover, the water absorption material 5 contained in the maldistribution region P of this bag body 11 consists of a sodium polyacrylate bridge formation object whose maximum water absorption is the self-weight [ 200 times ].

[0012] This water absorption sheet 10 puts the water absorption material 5 on the center section

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[Means for Solving the Problem] The bag body which the above-mentioned technical problem piled up the thermoplastic film of two sheets with which much pores were formed in one of these at least, and carried out the seal of the periphery section, It consists of granular water absorption material made unevenly distributed in the part in this bag body, and a closure means closed so that this granular water absorption material might not spread in [ whole ] a bag body. It is solvable by offering the water absorption sheet formed so that it might have the aperture of the range where it does not leak granular water absorption material although the pore of the above-mentioned bag body passes moisture and closure discharge of the above-mentioned closure means might be carried out by water absorption.

[0007] As for the aperture of the pore formed in the above-mentioned bag body, it is desirable that it is within the limits of 50 micrometers thru/or 150 micrometers. The above-mentioned closure means is the heat-sealing section or jointing formed between the thermoplastic films of two sheets which form a bag body, and when water absorption material absorbed water and expands, as for this heat-sealing section or jointing, it is desirable to be formed so that it may exfoliate by that expansion pressure. Moreover, this jointing is water solubility or water-softening nature, and it may be formed so that it may exfoliate with the moisture which passed the pore of a bag body.

[0008] Furthermore, the above-mentioned closure means is the PE liner made of the product made of paper, or a nonwoven fabric enclosed with the interior of said bag body, the aforementioned granular water absorption material may be enclosed with this PE liner, and it may be formed so that a part of periphery section [ at least ] of the PE liner of a parenthesis may carry out opening with the moisture which passed the pore of a bag body. This PE liner is a PE liner which consists of a water soluble film again, and you may come to enclose the aforementioned granular water absorption material in this PE liner. The above-mentioned granular water absorption material can sink in by the wetting agent which consists of hydrophilic polyhydric alcohol.

[0009]

[Embodiment of the Invention] Hereafter, an example explains the gestalt of operation of this invention using a drawing. However, this invention is not limited by the following examples.

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[0010] The closure means 12 in this example is the heat-sealing section (12) formed between 2bs of two sheets, polyethylene film 2a and 2b, and this heat-sealing section 12 is weakly formed in extent which exfoliates by that expansion pressure, when the water absorption material 5 absorbed water and expands. Peel strength to which the peel strength was based on JIS-Z -1707 is made into within the limits of 0.1kg / 15mm thru/or 1.0kg / 15mm.

[0011] The dimension of the bag body 11 in this example 1 is 170mmx250mm, and each thickness of polyethylene film 2a which forms a bag body 11, and 2b is 50 micrometers. The pore 1 of 100 micrometers of apertures within the limits which pass moisture and do not leak the granular water absorption material 5, and -- are formed in hole opening film 2a so that it may become 1.0% of numerical apertures. Moreover, the water absorption material 5 contained in the maldistribution region P of this bag body 11 consists of a sodium polyacrylate bridge formation object whose maximum water absorption is the self-weight [ 200 times ].

[0012] This water absorption sheet 10 puts the water absorption material 5 on the center section

(maldistribution region P) of nonporous polyethylene film 2b of for example, the above-mentioned dimension. By putting hole opening film 2a of the above-mentioned dimension from besides, while heat sealing superposition and the periphery section of both films strongly, film 2a and 2b It can manufacture by heat sealing weakly the periphery section of the maldistribution region P where the water absorption material 5 was contained so that peel strength may become within the limits of 0.1kg / 15mm thru/or 1.0kg / 15mm.

[0013] the case where the water absorption sheet 10 of this example 1 is used for absorption of drips, such as meat and a fish, -- such food -- the hole of the water absorption sheet 10 -- if placed and saved on the maldistribution region P by the side of empty film 2a, the generated drip will reach the water absorption material 5 through pore 1 and --, and will be absorbed by this. Since the water absorption material 5 will expand if moisture is absorbed, if water absorption progresses and the expansion pressure exceeds the peel strength of the weak heat-sealing section 12, the heat-sealing section 12 will exfoliate and a part of water absorption material 5 will advance to the flank (absent region) S of a bag body 11 from the maldistribution region P by expansion pressure and press according [ the water absorption material 5 which continues expansion further to coincidence ] to the weight of food. A water absorption region will be expanded by this according to a coefficient of water absorption, and the water absorption material 5 contained in the water absorption sheet 10 will be used for water absorption without futility.

[0014] (Example 2) The water absorption sheet of an example 2 is shown in drawing 2 . This water absorption sheet 20 consists of the same water absorption material 5 as the bag body 21 which was made to pile up mutually the two same hole opening film 2a as what was used for the example 1, and carried out the seal of the periphery section 3, and the thing used for the example 1 made unevenly distributed in the maldistribution region P of this bag body 21, and a closure means 22 closed so that this water absorption material 5 might not spread in [ whole ] a bag body 21 in drawing 2 . The closure means 22 in this case is swollen with that expansion pressure or water, when the water absorption material 5 absorbed water and expands, and it consists of jointing (22) formed so that it might exfoliate. The jointing 22 in this example is formed using a starch paste as adhesives.

[0015] This water absorption sheet 20 in for example, the maldistribution region P of hole opening film 2a of the above-mentioned dimension A starch paste water solution is applied to band-like at the periphery section of the maldistribution region P on which the water absorption material 5 (4.5g) was put, and the water absorption material 5 was put. While putting hole opening film 2a of another side from besides and heat sealing superposition and the periphery section of both films for Films 2a and 2a strongly, the starch paste spreading section is stuck by pressure and dried, and it can manufacture by forming jointing 22.

[0016] When using the water absorption sheet 20 of this example 2 for absorption of drips, such as meat and a fish, and food is placed and saved in the maldistribution region P of one of sheet surfaces, without caring about the both sides of a water absorption sheet, the generated drip will reach the water absorption material 5 through pore 1 and --, and will be absorbed by this.

[0017] On the other hand, since a starch paste is water solubility when moisture permeates from pore 1 and -- although jointing 22 maintained peel strength sufficient at the time of desiccation and hole opening film 2a and 2a are joined, it swells with moisture and peel strength falls remarkably. For this reason, if the water absorption material 5 expands by water absorption, closure discharge of the jointing 22 which that expansion pressure swelled will be carried out, and a part of water absorption material 5 will advance to the flank S of a bag body 21 by expansion pressure and the press by the gravity of food. As for the water absorption sheet 20, a water absorption region will be expanded by this according to a coefficient of water absorption, and the water absorption material 5 will be used for water absorption without futility.

[0018] (Example 3) The water absorption sheet of an example 3 is shown in drawing 3 (a) and (b). In drawing 3 (a) and (b) this water absorption sheet 30 The bag body 31 which was made to pile up mutually the two same hole opening film 2a as what was used for the example 1, and carried out the seal of the periphery section 3, It consists of the same water absorption material 5 as what was used for the example 1 made unevenly distributed in the interior of this bag body 31, and PE liner 32 made of thin

paper closed so that this water absorption material 5 might not spread in [ whole ] a bag body 31. The dimension of this PE liner 32 is 95mmx110mm, and one pair of periphery sections which this PE liner 32 counters are pasted up with the water-soluble adhesives 33, for example, a starch paste.

[0019] One jointing puts the water absorption material 5 of the specified quantity (4.5g) into above-mentioned PE liner 32 by which opening was carried out, and this water absorption sheet 30 stops that opening with the water-soluble adhesives 33, and can manufacture it by putting obtained PE liner 32 into the bag body 31 formed of hole opening film 2a of two sheets, and 2a, and heat sealing that periphery section strongly.

[0020] If the water absorption sheet 20 of this example 2 places and saves food on the maldistribution region P where PE liner 32 of a bag body 31 has been arranged, without caring about the both sides of a water absorption sheet when using for absorption of drips, such as meat and a fish The generated drip will penetrate the paper fiber gap of PE liner 32 by capillarity further through pore 1 and --, will reach the water absorption material 5, and will be absorbed by this.

[0021] On the other hand, since adhesives 33 are water solubility when moisture permeates from pore 1 and -- although the adhesives 33 which stopped opening of PE liner 32 maintained peel strength sufficient at the time of desiccation and the opening is stopped, it softens with moisture and peel strength falls remarkably. For this reason, if the water absorption material 5 expands by water absorption, closure discharge of the opening of PE liner 32 will be carried out by that expansion pressure, and a part of water absorption material 5 will march out in a bag body 31 from PE liner 32 by expansion pressure and the press by the weight of food. A water absorption region will be expanded by this according to a coefficient of water absorption, and the water absorption material 5 contained in the water absorption sheet 20 will be used for water absorption without futility.

[0022] (Example 4) The water absorption sheet of an example 4 is shown in drawing 4 . This water absorption sheet 40 consists of the bag body 41 which was made to pile up mutually the two same hole opening film 2a as what was used for the example 1, and carried out the seal of the periphery section 3, water absorption material 5 made unevenly distributed in the interior of this bag body 41, and PE liner 42 made from a water-soluble-chlorophyll-derivatives film closed so that this water absorption material 5 might not spread in [ whole ] a bag body 41 in drawing 4 . The dimension of PE liner 42 is 95mmx110mm.

[0023] The water absorption material 5 in this example infiltrates the glycerol (3g) as a wetting agent into the granular sodium polyacrylate bridge formation object (4.5g) whose maximum water absorption is the self-weight [ 200 times ].

[0024] This water absorption sheet 40 can be manufactured, when the water absorption material 5 of the specified quantity is put into above-mentioned PE liner 42 by which opening was carried out, and either stops opening, puts into the bag body 41 which formed this by hole opening film 2a of two sheets, and 2a and heat seals that periphery section strongly.

[0025] When using the water absorption sheet 40 of this example 4 for absorption of drips, such as meat and a fish, and food is placed and saved on the part by which PE liner 42 of a bag body 41 has been arranged, without caring about the both sides of a water absorption sheet, the generated drip will dissolve PE liner 42 partially at least through pore 1 and --, will reach the water absorption material 5, and will be absorbed by this.

[0026] On the other hand, since PE liner 42 is water solubility, if it dissolves or softens by permeation of moisture and the water absorption material 5 expands by water absorption for this reason, it will collapse by that expansion pressure and a part of water absorption material 5 will march out in a bag body 41 from PE liner 42 by expansion pressure and the press by the weight of food. A water absorption region will be expanded by this according to a coefficient of water absorption, and the water absorption material 5 contained in the water absorption sheet 40 will be used for water absorption without futility.

[0027] In each operation gestalt of this invention explained above, the thermoplastic film (for example, 2a in drawing 1 , 2b) which forms a bag body is a hydrophobic thing to which form status change-ization does not take place even if it contacts moisture, and it is desirable that it is the quality of the material which can maintain flexibility and reinforcement also at low temperature. As an example of a

suitable thermoplastic film, a monolayer film or laminated films, such as polyolefines, such as polyethylene and polypropylene, polyethylene terephthalate, a polyamide, ethylene / vinyl acetate copolymer, ethylene / vinyl alcohol copolymer, and polystyrene, can be mentioned from this viewpoint, for example.

[0028] Within the limits of 20 micrometers thru/or 100 micrometers is suitable for this thickness. When thickness exceeds less than 20 micrometers or 100 micrometers and it is referred to as hole opening film 2a, there is a case where uniform water absorption becomes impossible through pore 1 and --.

[0029] Although carry out melting punching with the needle been [ the needle / it ] well-known for example, heated from the former more than the melting point of a thermoplastic film as an approach of forming pore in the above-mentioned thermoplastic film, and manufacturing hole opening film 2a, pierce by punch in ordinary temperature or there is also the approach of keeping burning by laser etc., especially the approach of heating the roll in which the needle was planted to the temperature below the melting point, making penetrate by the physical force, and punching is suitable. According to this approach, a projection edge and the so-called weld flash arise at the rear face, and when the field of pore 1 and -- where this weld flash appeared is carried out inside and a bag body is manufactured, this weld flash acts as a kind of valve, permeation of the moisture from an outside to the inside is promoted by capillarity, and it is effective in preventing that the impalpable powder of the water absorption material 5 moreover leaks out outside through this pore 1 and --.

[0030] In hole opening film 2a manufactured from the thermoplastic film whose thickness is within the limits of 20 micrometers thru/or 100 micrometers preferably, pore 1 and the suitable aperture of -- are within the limits of 50 micrometers thru/or 150 micrometers. If it is this within the limits, it can prevent it not only can circulate at any time, but that, as for external moisture, the fine grain of the water absorption material 5 contained inside leaks pore 1 and -- to the exterior through pore 1 and --.

[0031] Moreover, since pore 1 and -- influence greatly at a water absorption rate, hole density is important, and although enlarging as much as possible is desirable from this viewpoint, it is desirable to consider as viewpoints, such as film reinforcement, to a manufacture top and 0.1% thru/or 2.0% of within the limits.

[0032] As long as the water absorption material used for the water absorption sheet of this invention is a granular thing generally used in the disposable diaper, the sanitary-items field, the irrigation|drainage-and-reclamation-engineering field, etc., any are sufficient as it. Generally a bridge is constructed over these in [ a water-soluble polymer ] three dimensions, and many classes are known. Desirable water absorption material to polysaccharide, such as starch and a cellulose, an acrylic acid, A methacrylic acid, acrylate, methacrylate, acrylic ester, Methacrylic ester, an acrylic-acid amide, a methacrylic-acid amide, acrylonitrile, The graft polymerization of any one or more sorts of the group which consists of a methacrylonitrile, a maleic acid, sulfonation styrene, polyvinyl pyridines, these oligomer, or co-oligomer is carried out. Or the bridge formation product of the polymerization object obtained by hydrolyzing after carrying out graft polymerization, Polyethylene oxide, polypropylene oxide, a polyvinyl pyrrolidone, Sulfonation polyethylene, polyvinyl pyridine, polyacrylate, Any one or more sorts of bridge formation products of a group which consist of polymethacrylic acid salts, polyacrylic acid amides, and polymethacrylic acid amides, They are vinyl acetate / acrylate copolymerization object, an isobutylene / maleic-anhydride copolymerization object, polyvinyl alcohol / maleic-acid copolymerization object, a carboxymethylcellulose bridge formation object, etc. As an example of the water absorption material of desirable marketing used for the water absorption sheet of this invention, PX-402A (Showa Denko K.K. make), SANWETTO IM-300 (Sanyo Chemical Industries, Ltd. make), AKUA keeping 10SH (Seitetsu Kagaku Co., Ltd. make), the AKUA rucksack CA (Nippon Shokubai Kagaku Kogyo Co., Ltd. make), etc. can be mentioned.

[0033] Since the particle size of water absorption material needs to be [ of the aforementioned pore 1 and -- ] larger than an aperture, it is desirable that it is the particle size of extent which remains to the plus sieve of 150 meshes, for example when [ of pore 1 and -- ] an aperture is 100 micrometers.

[0034] You may sink in by the wetting agent which the above-mentioned granular water absorption material becomes from hydrophilic polyhydric alcohol. The fluidity of the water absorption material to



which granular water absorption material is unevenly distributed in a bag body if it sinks in by the wetting agent is improved, and more uniform water absorption is attained.

[0035] As an example of the hydrophilic polyhydric alcohol which can be used as a wetting agent, ethylene glycol, propylene glycol, diethylene glycol monoethyl ether, 1, 3-butylene glycol, a glycerol, a polyethylene glycol, a polypropylene glycol, polyglycerin, xylitol, a sorbitol, maltitol, a methyl cellulose, carboxymethylcellulose, etc. can be mentioned, for example.

[0036] As for the mixed rate of granular water absorption material and this wetting agent, it is desirable that a wetting agent considers as within the limits of 20 weight sections thru/or the 200 weight sections to the granular water absorption material 100 weight section. Except this range, the fluidity of water absorption material and the homogeneity of water absorption fall.

[0037] In the water absorption sheet 20 shown in an example 2 and drawing 2, jointing 22 is formed considering the starch paste as adhesives. Be [ what is necessary / just since closure discharge is carried out in short at the time of water absorption ], although the starch pastes in this case are water-soluble adhesives, jointing 22 does not necessarily need to be water solubility or water-softening nature.

[0038] When jointing 22 is not water solubility or water-softening nature, the coverage of adhesives etc. is adjusted, and when the water absorption material 5 absorbed water and expands, this jointing 22 should just form so that it may exfoliate by that expansion pressure. Although especially the adhesives at this time are not limited, it is desirable to use the adhesives of the synthetic-resin system which can paste up mutually the thermoplastic film used for the bag body 21.

[0039] As for the above-mentioned jointing 22, it is still more desirable that they are water solubility or water-softening nature. In this case, the thermoplastic film which the adhesives which can be used are water solubility or water-softening nature, and was used for the bag body 21 can be pasted up mutually. As the suitable example, a starch paste, natural polysaccharide, glue, gum arabic, an alginic acid, polyvinyl alcohol (PVA), etc. can be mentioned. From a viewpoint on food sanitation hygiene, a starch paste and natural polysaccharide are especially suitable.

[0040] In the water absorption sheet 30 shown in an example 3 and drawing 3, PE liner 32 is a product made of paper, or a product made of a nonwoven fabric. As for these materials, moisture can circulate by capillarity through the field. Therefore, pore 1 and the moisture which passed -- can penetrate the field of PE liner 32 further, and can be given to the water absorption material 5. As for the viewpoint of the permeability of moisture, and economical efficiency to this PE liner 32, it is desirable to produce using the tissue paper's thin paper.

[0041] A part of periphery section [ at least ] of the product made of paper or PE liner 32 made of a nonwoven fabric is stopped by the water-soluble adhesives 33. Although any are sufficient as them as long as the water-soluble adhesives which can be used here can paste up the quality of the material of PE liner 32, they can mention a starch paste, natural polysaccharide, glue, gum arabic, an alginic acid, PVA, etc. as the desirable example, for example. From a viewpoint on food sanitation hygiene, a starch paste and natural polysaccharide are especially suitable.

[0042] In the water absorption sheet 40 shown in an example 4 and drawing 4, PE liner 42 which encloses the water absorption material 5 is formed with a water soluble film. This water soluble film is what has the thickness and flexibility of extent which is not torn even if it connotes the water absorption material 5 by dryness, and it is desirable that it is sanitarly safe. Moreover, when the water absorption material 5 contains a wetting agent, it is necessary for this water soluble film not to dissolve in a wetting agent.

[0043] As a suitable example of the water soluble film which can be used, a starch film, a wafer paper film, a water-soluble polyvinyl alcohol film, a natural polysaccharide film, a collagen film, a pullulan film, etc. can be mentioned.

[0044] Even if the water absorption sheet of this invention is the thing of which the above-mentioned operation gestalt, the keypunch conventionally used in this field on the occasion of that manufacture, a bag sealer, a restoration machine, its heat sealer, etc. are usable.

[0045] The water absorption sheet of this invention is not only used for water absorption of food, but in fields, such as a disposable diaper, sanitary goods, and irrigation|drainage and reclamation engineering,



it can use it effectively if needed. Moreover, the water absorption sheet of this invention can be discarded as for example, usual incineration trash in this case, although it is generally made throwing away after using it for water absorption.

[0046] (Water absorption test) The water absorption test was conventionally performed about the water absorption sheet of the example 1 of a comparison of a type each water absorption sheet of the above-mentioned example 1 - an example 4, and on condition that the following. Drawing 5 explains the configuration of the water absorption sheet of the example 1 of a comparison used here for the comparison. In drawing 5 the water absorption sheet 50 of this example 1 of a comparison The bag body 54 which piled up the 170mmx250mm nonwoven fabric 51 made from polypropylene, and this and the polyethylene film 52 of this dimension, and heat sealed the periphery section 53 is formed. The water penetration papers 55 and 55 which are two sheets whose dimensions are 150mmx220mm, respectively are enclosed with the interior of this bag body 54 in piles, and homogeneity comes to pinch the water absorption material 5 (4.5g) among two sheets of these water penetration papers 55 and 55.

[0047] The conditions of a water absorption test are as follows. the center section of each water absorption sheet gently put on the level base -- a filter paper (made in the Kiriya factory, the diameter of 60mm, hold particle diameter of 4 micrometers) -- placing -- a funnel mold with a capacity graduation to a it top -- the funnel was installed. this funnel -- 250ml pure water was put in inside, it was dropped on the filter paper, and the duration until the pure water of predetermined capacity penetrates a filter paper and is absorbed by the water absorption sheet was measured. A test result is shown in Table 1.

[0048]

[Table 1]

試料	所定容量の純水の吸水時間 (分)				
	25ml	50ml	100ml	150ml	250ml
実施例1	4	9	20	33	76
実施例2	2	9	26	42	92
実施例3	3	10	28	42	98
実施例4	4	10	25	38	80
比較例1	4	11	30	52	104

[0049] Each water absorption sheet of an example 1 - an example 4 is absorbing 250ml pure water from the water absorption sheet of the example 1 of a comparison for a short time so that clearly from the result of Table 1. This shows that water absorption material was consumed to water absorption effectively without futility, when the water absorption sheet of each example expands a water absorption region according to a coefficient of water absorption. On the other hand, although absorption time amount is equivalent to each example if the water absorption sheet of the example 1 of a comparison is little water, since only an osmosis part swells and moisture does not shift to other parts by water absorption, it turns out that the time amount which water absorption takes was extended as amount of water increased, and water absorption effectiveness fell.

[0050]

[Effect of the Invention] The bag body which the water absorption sheet of this invention piled up the thermoplastic film of two sheets with which much pores were formed in one of these at least, and carried out the seal of the periphery section, It consists of granular water absorption material made unevenly distributed in the part in this bag body, and a closure means closed so that this granular water absorption material might not spread in [ whole ] a bag body. Since it is formed and becomes so that it may have the aperture of the range where the pore of the above-mentioned bag body passes moisture, and does not leak granular water absorption material and closure discharge of the above-mentioned closure means may be carried out by water absorption The closure of the grain-like water absorption material to which this water absorption sheet absorbs water is canceled, a water absorption region is expanded by even the absent region of water absorption material within a bag body by breadth and this, that part corresponding to a coefficient of water absorption, and water absorption material comes to be used for water absorption without futility.

[0051] [ whether the above-mentioned closure means is the weak heat-sealing section or jointing formed so that it might exfoliate by the expansion pressure of water absorption material, and ] If it is jointing of water solubility or water-softening nature, or it is a PE liner made of the product made of paper, or a nonwoven fabric and it is the PE liner which is formed so that a part of the periphery section [ at least ] may exfoliate with moisture and opening may be carried out, or consists of a water soluble film With the moisture from the outside, the closure is canceled easily and quickly and quick water absorption is attained.

[0052] Since the keypunch which faces manufacturing the water absorption sheet of this invention, and is conventionally used in this field, a bag sealer, a restoration machine, a heat sealer, etc. can be used, a special facility cannot be required but it can manufacture cheaply and in large quantities. Moreover, since it can discard as for example, usual incineration trash after using it for water absorption, problems, such as environmental pollution, are not produced.

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[Translation done.]